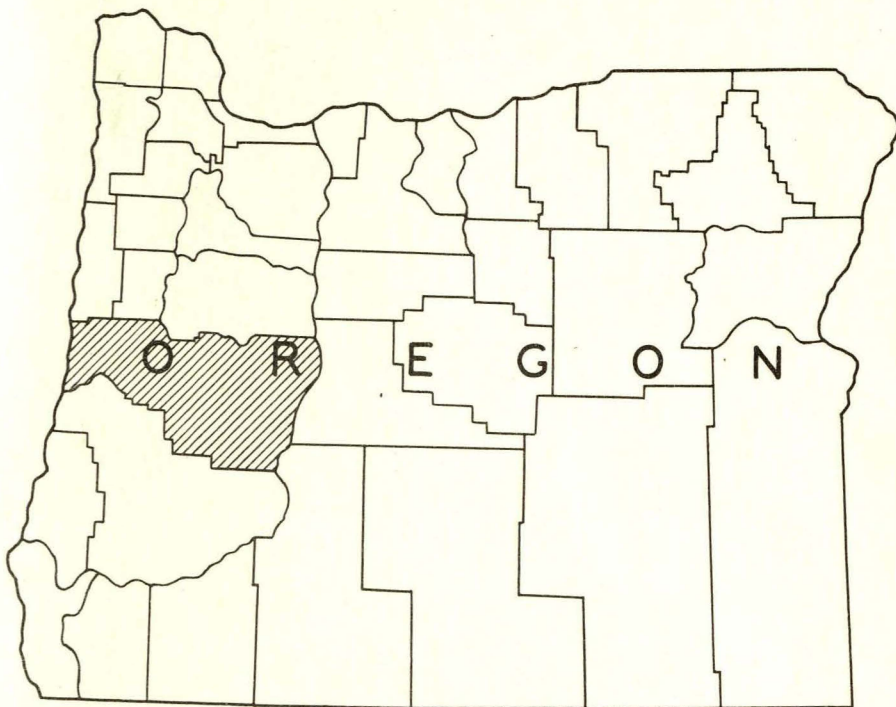


FOREST STATISTICS
FOR
LANE COUNTY, OREGON

FROM THE FOREST SURVEY INVENTORY REVISED IN 1942

FOREST SURVEY REPORT NO. 92



U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE
PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION

STEPHEN N. WYCKOFF, DIRECTOR

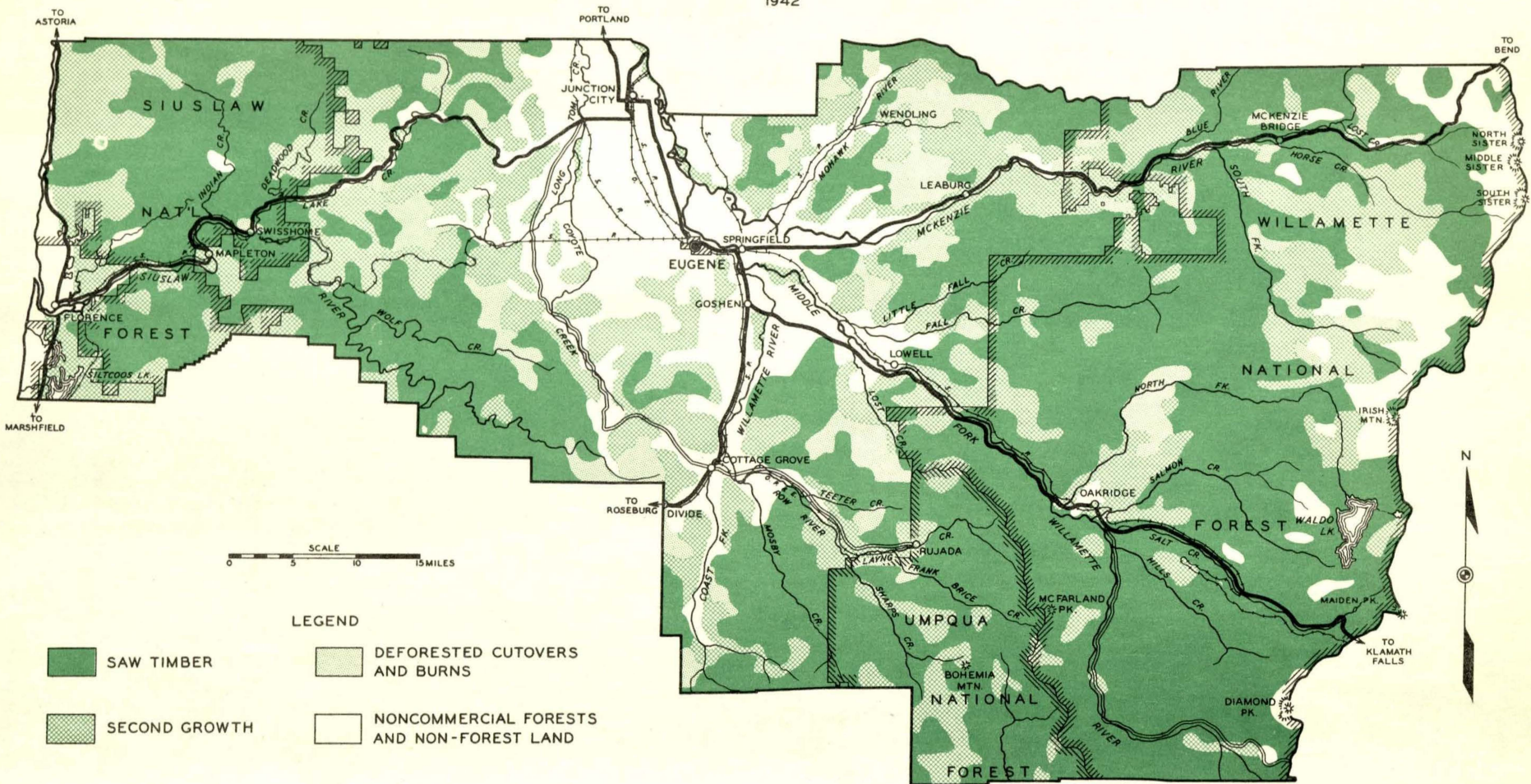
R.W. COWLIN, IN CHARGE OF FOREST SURVEY

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PORTLAND, OREGON

DECEMBER 20, 1943

FIGURE 1
 OUTLINE MAP OF LANE COUNTY, OREGON
 1942



FOREWORD

The forest survey, a Nation-wide project, consists of a detailed investigation in five major parts of present and future forest resources: (1) An inventory of the country's existing forest resources in terms of areas occupied by forest-cover types and of timber volumes, by species, in board feet and cubic feet, and a study of conditions on cut-over and on burned forest lands; (2) a study of the depletion of the forests through cutting and through loss from fire, insects, disease, and other causes; (3) a determination of the current and potential growth on forest areas; (4) an investigation of present and prospective requirements of the United States for forest products; and (5) an analysis and correlation with other economic data of findings of these studies in order to make available basic facts and guiding principles necessary to plan for sound management and use of forest resources.

The forest survey of Oregon and Washington, an activity of the Pacific Northwest Forest and Range Experiment Station, was conducted in the Douglas-fir region during the period 1930-33.^{1/} In 1937 work of keeping the survey up to date was commenced in counties in which there had been a large amount of cutting depletion since the original survey.

The inventory phase of the survey was conducted in Lane County, Oregon, in 1932 and a statistical report summarizing the results and a detailed forest type map were issued. In 1942 a reinventory of the county's forests was made to bring the statistical data and type map up to date. Adjustments, based on field examination, were made for changes in forest-type acreages and timber volumes due to logging and fire, restocking of cut- and burned-over areas, and transfer of land ownership since the original inventory. Revised statistics are given in this report and prints of the revised type map may be obtained.^{2/}

^{1/} Oregon and Washington were divided for survey purposes into two regions, (1) Douglas-fir region, consisting of that part of both states west of the Cascade Range summit, and (2) ponderosa pine region, that part of both states east of the Cascade Range summit. A regional report which includes an interpretation of the forest survey data and analysis of the forest situation has been published for each of the two regions.

^{2/} For information on the detailed 1-inch-to-the-mile forest type map of the county or the 1/4-inch-to-the-mile lithographed state type maps covering Oregon and Washington, address Director, Pacific Northwest Forest and Range Experiment Station, 423 U. S. Court House, Portland 5, Oregon.

FOREST STATISTICS FOR LANE COUNTY, OREGON

Contents

	Page
Introduction	1
Physical character of county	1
Siuslaw River drainage	2
Willamette River drainage	2
Extent and character of forests	3
Conifers of saw-timber size	3
Conifers less than saw-timber size	7
Hardwoods	9
Deforested lands	9
Noncommercial forests	10
Productive capacity of forest land	11
Volume of merchantable timber	13
Forest ownership	13
Private	15
National forests	15
Revested grant lands	16
Other ownerships	16
Forest utilization	17
Forest depletion	19
Forest growth	20
Present and future aspects of forest situation	21

Figure

- | | |
|---------------------------------------|--------------|
| 1. Outline map of Lane County, Oregon | Inside cover |
|---------------------------------------|--------------|

Tables

- | | |
|--|----|
| 1. Area, in acres, of all forest cover types, by ownership class | 4 |
| 2. Area, in acres, of generalized forest types, by ownership class | 5 |
| 3. Area, in acres, of certain immature conifer forest types, by age class and degree of stocking | 8 |
| 4. Land areas, forest land areas, and commercial conifer areas, by site quality class | 12 |
| 5. Volume of timber by species and ownership class | 14 |
| 6. Number, actual 8-hour capacity, and annual production of active sawmills, 1942 | 18 |
| 7. Current annual growth, by forest type group, 1942 | 20 |

FOREST STATISTICS FOR LANE COUNTY, OREGON

By F. L. Moravets^{3/}

Expansion of the lumber and allied wood-using industries in Lane County, Oregon, during the past two decades has been at a rapid pace. Statistics show that from 1925 to 1942 the volume of sawlogs produced annually in the county increased 325 percent; the increase in the yearly output of lumber was even greater--363 percent. Although this large increase in activity in 1942 over 1925 was partly the result of the war-created demand for lumber and other wood products, it was chiefly the result of a steady growth that prevailed during the interval in all but the depression years of the early 1930's.

The forests of Lane County contain a merchantable saw-timber volume of 55 billion board feet, log scale, a volume only exceeded by one county in the United States--Douglas County, Oregon--and by only four states--Oregon, Washington, California, and Idaho. This vast resource, principally of Douglas-fir, has proven particularly attractive to lumbering enterprises in cut-out portions of the Douglas-fir region and resulted in a migration to the county that will probably continue for some time.

Through the original inventory of the county's forests in 1932 and reinventory in 1942, the forest survey has compiled much statistical information on the extent and character of the forests, the past rate of their depletion, and the current rate of their growth. Analysis of this information follows.

Physical Character of County

The total land area of Lane County is 2,959,235 acres, roughly three times the average area of western Oregon counties. It stretches from the Pacific Ocean eastward to the summit of the Cascade Range, a distance of about 115 miles. The western portion of the county is narrow, the frontage on the ocean being about 30 miles, but in the central valley portion the greatest width is 89 miles (figure 1).

Topographic features divide the county into two quite distinct geographic units--the western portion which comprises all of the drainage of the Siuslaw River, and the central and eastern portions which comprise the upper drainage basin of the Willamette River.

^{3/} Field work of the revised inventory was done by E. D. Buell, A. A. Poust, P. A. Brinson, V. J. Hughes, H. D. Miller, and J. W. Wilkinson; data compilation was done by Inga E. Fulkerson, Dorothy L. Masche, G. S. Meagher, G. E. Morrill, and W. H. Schwindel.

Siuslaw River Drainage

The Siuslaw drainage, lying between the ocean and the summit of the Coast Range, is a region of abundant rainfall--averaging from 60 to more than 80 inches annually. It has a mild climate with slight temperature fluctuations and fertile, well-drained soils. The topography is very broken although not extremely rugged. The main stream flows sinuously through a sharply cut valley along which are only a few narrow stretches of bottom land; the many tributary streams have likewise cut deep narrow valleys. The resultant relief consists of a network of sharp ridges and short steep slopes. The altitudinal range is small--sea level to 2,475 feet, the height of Cummings Peak. Several other peaks rise above 2,000 feet but the general height of land is between 500 and 1,500 feet.

Topography, climate, and soil combine here to produce a site more favorable for forest production than for any other major land use. Agriculture to date has been confined to the small acreage of bottom land. Forests form an almost complete mantle over this portion of the county. Other than the agricultural areas, the only deforested lands are the sand dunes along the coast, a few nonrestocked burns of limited extent, and a small acreage of recently clear-cut land in the upper part of the drainage.

Immature forests cover the vast bulk of the drainage. Although these young stands vary in age from 10 to 90 years, most of them are from 60 to 80 years old, having resulted from the restocking of vast burns, deforested about the middle of the nineteenth century when disastrous fires swept much of the Oregon coast country. Mature forests which escaped the fires lie chiefly in the upper portion of the drainage.

Douglas-fir predominates throughout all of the drainage except near the coast where mixed stands of Sitka spruce and western hemlock cover a relatively small acreage. Red alder is a common associate of the fir in practically all of the immature stands and frequently comprises a material part of the stand.

Willamette River Drainage

The portion of Lane County lying between the summits of the Coast and Cascade Ranges is topographically a well-defined basin in which arise the southernmost tributaries of the Willamette River--the Middle Fork, Coast Fork, and McKenzie Rivers. Where these streams merge, in the north-central part of the county, a broad valley is formed. The valley floor, which consists of wide stretches of alluvial flats broken only by a few minor buttes, lies at a general level of from 325 to 450 feet. To the west of the valley, rolling foothills and long gentle slopes rise to the summit of the Coast Range; likewise to the south, ascent to the divide between the Coast Fork and Umpqua River drainage is gradual. Eastward, however, the ascent from the valley to the summit of the Cascade Range is over a more rugged terrain characterized by deeply cut narrow

stream courses and steep slopes leading to sharp ridge tops. Several peaks rise above the general height of land which varies from 2,000 to 5,500 feet. Three of the peaks--the North, Middle, and South Sisters--along the summit of the range rise to more than 10,000 feet.

Precipitation over the central valley and foothills lying in the lee of the Coast Range averages from less than 40 inches to about 50 inches annually. Eastward from the valley the total fall of rain and snow increases gradually with ascent of the slope until near the summit of the Cascades the annual total may exceed 80 inches. Temperature fluctuation in the Willamette drainage basin likewise shows considerably more variation than in the coastal section of the county.

Physical conditions favor the growth of Douglas-fir over other trees here and this species either forms pure stands or dominates in mixed stands throughout the drainage except on dry sites and along stream courses of the central valley and on upper slopes of the Cascades. At the advent of white settlement the forest mantle was complete except for natural prairies in the valley and treeless barrens above timber line on the higher mountains. Nearly a century of settlement has enlarged the area of nonforest land until a total of approximately 300,000 acres in the valley is devoted to agricultural use. An additional 350,000 acres has been clear cut by logging operations but remains in a forest-land status--some restocked and some deforested.

Extent and Character of Forests

In the reinventory the forest survey classified a total of 2,555,480 acres as forest land, 86 percent of the county's total land surface. Of the remaining area, 348,605 acres was found to be in agricultural use either in cultivation or in fenced stump pastures; sand dunes, tideflats, permanent brush fields, barrens above timber line, town sites, and unmeandered water surfaces totaled 55,150 acres.

Table 1 gives a breakdown of the forest land by the various forest types. Grouping of the detailed types into broad types is shown statistically in table 2 and graphically in figure 1.

Conifers of Saw-timber Size

Under local prevailing logging practices and utilization standards, trees cut for sawlogs are generally 20 inches or more in diameter at breast height. In the survey, stands composed of trees of this size were classified as saw-timber types. Collectively, these types cover 1,496,000 acres, about 59 percent of the county's forest land acreage. As seen in figure 1, the saw-timber stands cover broad unbroken expanses of the county. Logging has broken the continuity of the stands principally along the foothills bordering the central valley and for considerable distances up the larger tributary streams. The larger breaks in the saw-timber cover caused by bodies of second-growth timber that have restocked old burns occur on both sides of the Coast Range summit and on the slopes leading to the Cascade summit.

Table 1.--Area, in acres, of all forest cover types, by ownership class
Data corrected to July 1, 1942

Type No.	Type	Private	State		County	Indian	Federal				Total
			Available	1/ Reserved			Revested land grant	Public ^{2/} domain	National forest		
									Available	Reserved	
4	Woodland: oak-madrone	8,315					5	5			8,325
	Douglas-fir										
6	Large old growth	220,525	1,255	10	8,500		54,705	535	130,665		416,195
7	Small old growth	62,355	1,705	40	3,105		65,540	115	315,855		448,715
8	Large second growth	103,550	2,870	40	8,150	835	36,440	355	292,490	4,985	449,715
9	Small second growth	192,595	3,925	130	14,675	515	36,685	2,590	212,985	24,160	488,260
10	Seedlings and saplings	90,105	6,410	110	14,175		36,480	1,560	39,455		188,295
	Sitka spruce										
11	Large	885		120	75			5	1,345		2,430
12	Small	2,490		80	120	5			2,145		4,840
13	Seedlings and saplings	715			35				495		1,245
	Western hemlock										
14	Large	865			80	5	25		4,170		5,145
15	Small	195		25			60		135		415
16	Seedlings and saplings	120			35		90		100		345
17	Western redcedar, large	70					35		750		855
20	Ponderosa pine, large	340							930		1,270
	Fir-mountain hemlock										
23	Large	1,495	45		505				133,950	36,110	172,105
24	Small				10				9,965	285	10,260
26	Lodgepole pine, small	5,275	170	55	675	10			30,410	37,720	74,315
	Hardwood										
31.5	Large	17,220	35	40	90		1,045	85	16,505		35,020
31	Small	11,600	55	60	775	175	810	35	10,650		24,160
33	Subalpine	150							9,770	9,760	19,680
	Nonrestocked cutover										
35	Cut prior to 1920	5,455	55		360		205				6,075
35A	Cut from 1920-29, incl.	18,755	305		1,795		8,825		15		29,695
36	Recent cutover, since 1930	85,625	840	40	3,685	235	20,725		11,795		122,945
37	Deforested burn	6,025	730	110	1,140	15	5,565	245	16,100	980	30,910
38	Noncommercial rocky area	525					300	85	13,355		14,265
	Total forest types	835,250	18,400	860	57,985	1,795	267,540	5,615	1,254,035	114,000	2,555,480
	Nonforest land										
3	In agricultural use	341,650	585	140	1,260	80	980	100	3,810		348,605
2	Other	27,180		115	1,270	55	285	70	12,045	14,130	55,150
	Total	1,204,080	18,985	1,115	60,515	1,930	268,805	5,785	1,269,890	128,130	2,959,235

1/ Includes 40 acres in municipal ownership.

2/ Includes 25 acres in lighthouse reservation.

Table 2.--Area, in acres, of generalized forest types, by ownership class
Data corrected to July 1, 1942

Type definition	Private	State		County	Indian	Federal				Total
		Available	1/ Reserved			Revested land grant	Public ² domain	National forest		
								Available	Reserved	
Conifer saw timber Types 6, 7, 8, 11, 14, 17, 20, and 23	390,085	5,875	210	20,415	840	156,745	1,010	880,155	41,095	1,496,430
Conifer second growth Types 9, 12, 15, and 24										
On cut-over areas	77,785	1,035	95	2,095		3,510	25	785		85,330
On old burns	117,495	2,890	140	12,700	520	33,235	2,565	216,330	24,160	410,035
Total	195,280	3,925	235	14,795	520	36,745	2,590	217,115	24,160	495,365
Conifer seedlings and saplings Types 10, 13, 16, and 24										
On cut-over areas	67,915	2,875	110	10,355		14,600	5	10,100		105,960
On old burns	23,025	3,535		3,900		21,970	1,555	38,065	285	92,335
Total	90,940	6,410	110	14,255		36,570	1,560	48,165	285	198,295
Recent cut-over areas Type 36	85,625	840	40	3,685	235	20,725		11,795		122,945
Nonrestocked cut-over and burned-over areas Types 35, 35A, and 37	30,235	1,090	110	3,295	15	14,595	245	16,115	980	66,680
Hardwoods Types 31 and 31.5	28,820	90	100	865	175	1,855	120	27,155		59,180
Noncommercial areas Types 4, 26, 33, and 38	14,265	170	55	675	10	305	90	53,535	47,480	116,585
Total forest types	835,250	18,400	860	57,985	1,795	267,540	5,615	1,254,035	114,000	2,555,480
Nonforest land Types 2 and 3	368,830	585	255	2,530	135	1,265	170	15,855	14,130	403,755
Total	1,204,080	18,985	1,115	60,515	1,930	268,805	5,785	1,269,890	128,130	2,959,235

1/ Includes 40 acres in municipal ownership.

2/ Includes 25 acres in lighthouse reservation.

With the exception of type 8 stands (large second-growth Douglas-fir from 22 to 40 inches d.b.h.) the saw-timber stands in the county are almost wholly composed of mature or overmature timber; only a small acreage of the Sitka spruce, western hemlock, and balsam fir-mountain hemlock types is stocked with young thriftily growing timber.

Predominance of Douglas-fir in the county is emphasized by the fact that on 88 percent of the saw-timber acreage, 60 percent or more of the merchantable volume is of this species. On most of the remainder of the acreage the major part of the volume is of mountain hemlock in mixture with one of the balsam firs--Pacific silver fir or noble fir.

The acreage of Douglas-fir saw-timber stands is very evenly distributed between the three size classes--types 6, 7, and 8--as a glance at table 1 will show.

Stands of large old-growth Douglas-fir (type 6) occur in the county generally below the 2,500-foot level. They occupy the foothills bordering the central valley and the lower slopes of the mountainous sections and, being the most accessible stands in the county, have furnished the vast bulk of the sawlogs cut to date. Large bodies of this class of timber remain in the Willamette drainage south and east of the central valley and south of the main stream in the Siuslaw drainage.

The type 6 stands in the county seem to be of two general age classes. On about a third of the type's acreage the stands are from 400 to 450 years old; on the remainder they average about 300 years old. The older timber is an excellent quality yellow fir that should cut a high percentage of clear material; the younger timber is a coarser grained growth with a tendency towards roughness--a typical so-called bastard fir suitable for the common grades of lumber. Approximately 90 percent of the net volume in these large old-growth stands is Douglas-fir; the bulk of the remainder is western redcedar and western hemlock. Throughout the type's range there is a small amount of grand fir present; south and east of the central valley, California incense-cedar comprises a small percentage.

Most of the stands of small old-growth Douglas-fir (type 7) lie above the type 6 stands at elevations from 2,000 to 5,000 feet. The major portion of the type's acreage is on the middle slopes of the Cascades and along the crest of the Coast Range. The fir in this type averages about 230 years old and is generally of good quality. Cruises show that Douglas-fir comprises about 96 percent of the merchantable volume in stands of this type; associated species are the same as in the older stands. Only a limited acreage of this class of fir has been logged in the county.

The largest single body of large second-growth Douglas-fir (type 8) lies in the north-central portion of the Siuslaw drainage--a stand about 80 years old and generally well stocked. Other large bodies of the type lie in the upper watersheds of the McKenzie and Middle Fork Willamette Rivers. These stands are from 80 to 140 years old. This

immature class of fir is on the whole quite rough and limby and, if utilized in the near future, will be suitable only for the common grades of lumber and ties.

Saw-timber stands composed of mountain hemlock in mixture with one or more of the balsam firs--Pacific silver fir, noble fir, or alpine fir--cover 172,000 acres on the upper slopes of the high Cascades. These stands, which may also include a small percentage of western hemlock, western white pine, or lodgepole pine, contain a net merchantable volume of from 5 to 25 M board feet per acre. Quality of timber likewise varies considerably depending on altitudinal location, exposure, and soil. Being remote from transportation facilities and on rough ground generally, this type of timber has not been utilized in the county to date.

None of the other saw-timber types that occur in the county--types 11, 14, 17, and 20--stock sufficient acreages to be of major importance.

Conifers Less Than Saw-timber Size

A little more than a fourth--27 percent--of the county's forest land is now occupied by second-growth conifer stands in which the trees are less than saw-timber size. There are several parts of the county where these immature types cover fairly broad areas. Along the coast there is a belt, from 5 to 10 miles in width, stocked with young mixed stands of Sitka spruce, western hemlock, and Douglas-fir that restocked deforested burns. Along the summit of the Coast Range and eastward to the central valley, second-growth stands occur in patchwise distribution with remnant stands of old growth, recently logged areas, and cleared lands. East of the valley there are large bodies of young stands along most of the length of the McKenzie River watershed; in the lower portion they have restocked cut-over lands, in the upper portion they have restocked burns. Other fairly large concentrations lie in the watersheds of the Middle Fork Willamette and Coast Fork Rivers.

Table 3 shows the acreage of each of the second-growth conifer types by age class and degree of stocking.

The 488,000 acres of type 9, small, second-growth fir 6-20 inches d.b.h. is composed of stands from 20 to 90 years old fairly well distributed among the 30- to 80-year classes. As a whole these stands are fairly well stocked; on 87 percent of the acreage they are of medium stocking or better--the weighted average stocking for the type is 62 percent of normal. Four-fifths of the type's acreage is restocked deforested burn. Practically all of these stands are even-aged and many are pure in composition; as a rule, Douglas-fir comprises more than 85 percent of the stand.

The 188,000 acres of type 10, seedling and sapling Douglas-fir 0 to 6 inches d.b.h., represents another important forest asset. More than half of the acreage is cut-over land. On approximately two-thirds of the area, the stands are in the 10-year-age class. Stocking is

Table 3.--Area, in acres, of certain immature conifer types
by age class and degree of stocking

Data corrected to July 1, 1942

Age class (years)	Degree of stocking	Type number and name						Total
		10 Douglas- fir seedlings and saplings	9 Douglas- fir small second growth	13 Sitka spruce seedlings and saplings	12 Sitka spruce small second growth	15 & 16 Western hemlock second growth	24 Fir- mountain hemlock second growth	
10	Good	11,595						11,595
	Medium	65,535		475				66,010
	Poor	42,940				60		43,000
	Total	120,070		475		60		120,605
20	Good	15,100	865	350		100	1,585	18,000
	Medium	32,565	1,340			185	115	34,205
	Poor	14,385	505					14,890
	Total	62,050	2,710	350		285	1,700	67,095
30	Good	3,050	22,730				6,680	32,460
	Medium	2,870	28,390	285			30	31,575
	Poor	110	5,605	135	135			5,985
	Total	6,030	56,725	420	135		6,710	70,020
40	Good	135	27,855		525	75	530	29,120
	Medium	10	52,780		100	115	1,185	54,190
	Poor		11,690		1,200			12,890
	Total	145	92,325		1,825	190	1,715	96,200
50	Good		26,920					26,920
	Medium		46,020		40	100	105	46,265
	Poor		21,910		280			22,190
	Total		94,850		320	100	105	95,375
60	Good		52,260		225			52,485
	Medium		45,430		485		30	45,945
	Poor		17,180		465	35		17,680
	Total		114,870		1,175	35	30	116,110
70	Good		33,985					33,985
	Medium		31,060		715	60		31,835
	Poor		5,030		460			5,490
	Total		70,075		1,175	60		71,310
80	Good		14,135					14,135
	Medium		34,070		125	30		34,225
	Poor		2,955		85			3,040
	Total		51,160		210	30		51,400
90+	Good		3,475					3,475
	Medium		1,425					1,425
	Poor		645					645
	Total		5,545					5,545
Total all ages	Good	29,880	182,225	350	750	175	8,795	222,175
	Medium	100,980	240,515	760	1,465	490	1,465	345,675
	Poor	57,435	65,520	135	2,625	95		125,810
	Total	188,295	488,260	1,245	4,840	760	10,260	693,660

considerably poorer than in the type 9 stands; about 70 percent of the acreage is of medium stocking or better and weighted average stocking is 51 percent of normal. Although there may be some improvement in the density of stocking of these young stands as they grow older, this improvement will be slow and, in the case of many of the present sparse seedling stands, insufficient to produce good clear timber or to fully utilize the productive capacity of the land.

Practically all of the young Sitka spruce, western hemlock, and fir-mountain hemlock stands, which together cover only about 17,000 acres, are on old burns.

Generally speaking the second-growth stands that occupy burns are considerably better stocked than those on cut-over land. Weighted average stocking of those on burns is 63 percent, of those on cut-over land, 48 percent.

Hardwoods

Red alder and bigleaf maple are found throughout all parts of the county except on the upper slopes of the mountainous sections. However, their occurrence is generally limited to a scattered stocking in the understory of coniferous stands. In the well-watered Siuslaw drainage, alder forms pure stands on the narrow bottoms of practically all of the stream courses.

In the central valley northern black cottonwood forms a narrow border along much of the length of the main stream courses through the valley. Oregon ash is found also in this portion of the county on wet swales and at times in mixture with the cottonwood. Scattered stands of Oregon white oak cover some of the drier sites on the lower foothills; on some of these areas the trees do not attain saw-timber size or quality but are rough and stunted.

On about three-fifths of the total hardwood area of 59,000 acres, the stands contain trees of saw-timber size (12 inches and more d.b.h.).

Deforested Lands

A total of 190,000 acres, roughly 7 percent of the county's forest land, is currently in a deforested condition. Part of this acreage has been deforested for upwards of 15 years and may continue so indefinitely, unless artificially regenerated. Part of it, deforested recently through clear-cutting operations, may or may not restock readily. Clear cutting removed the original stand from five-sixths of the acreage, fire deforested the remainder.

Of the nonrestocked cut-over lands, a total of 6,000 acres was logged prior to 1920 and 30,000 acres was logged during the decade 1920-29. The acreage of the earlier logged lands is comprised of a number of small tracts from 50 to 200 acres and a few up to 1,000 acres in extent;

the acreage of the latter is likewise comprised chiefly of small tracts but does include one area of approximately 10,000 acres in the McKenzie River watershed. Apparently the history since logging is much the same on the nonrestocked areas--recurring fires have swept over them from one to several times since the original slashing fire. Fire records show that parts of the 10,000-acre tract have had three reburns since 1930.

Areas logged since January 1, 1930, which total 123,000 acres, were classified in the reinventory as type 36, recent cut-over land. In view of the relatively short time that had elapsed since the major part of this acreage was logged, no determination of the status of regeneration was made. In general, individual tracts of recent cut-over land in the county do not average large in acreage. In the district between the central valley and the summit of the Coast Range, there are numerous tracts from 500 to 1,000 acres but only a few of larger size. In the McKenzie, Coast Fork, and Middle Fork watersheds there are fewer tracts but some cover up to 10,000 acres and are the result of fairly rapid spread of cutting over the area.

Restocking of the major portion of the recent cut-over acreage is mainly contingent on prevention of reburns. Lack of seed supply is a factor on some of the large tracts but many of the smaller tracts are surrounded by stands of seed-producing age and should get some seeding in from the side.

The 31,000 acres of deforested burns, restocked at time of reinventory, is comprised of a considerable number of small areas less than 500 acres scattered throughout several parts of the county and a few somewhat larger areas in the McKenzie watershed. Some of the larger areas lie on upper slopes and ridges in the rougher mountainous portion.

Noncommercial Forests

Lands supporting forests which are at present considered to be noncommercial in character aggregate 117,000 acres, less than 5 percent of all forest land. Included in this total is 74,000 acres of lodgepole pine stands which are found on the higher slopes of the Cascades just below timber line and along the coast near the mouth of the Siuslaw River. These pine stands are composed of trees of less than saw-timber size, generally 3 to 9 inches d.b.h.

Subalpine forests of short, limby, and low-quality mountain hemlock and alpine fir cover 20,000 acres on the higher slopes and ridges near the summit of the Cascades. The subalpine and lodgepole pine forests are both valuable as an effective vegetative cover on the upper watersheds and as an important part of the high mountain scenery.

Steep, rocky slopes, lying within the commercial forest zone, on which there is insufficient soil to produce timber of merchantable size and character were classified as noncommercial rocky areas. On the slopes of the Cascades, there are several areas of this character. They total 14,000 acres.

Areas of oak-madrone woodland, totaling 8,000 acres, occur on the lower foothills west of the central valley. They are dry, infertile sites that support a stunted growth of Oregon white oak and Pacific madrone.

Productive Capacity of Forest Land

Physical factors that influence productivity of tree growth--soil, rainfall, temperature, drainage, altitude, aspect, and slope--vary widely over a forested area as broad as that of Lane County. Various combinations of these factors result in different degrees of productivity. In the survey all lands classed as commercial conifer land--2,380,000 acres--were rated, as to productive capacity, by one of three site-quality classifications--Douglas-fir, spruce-hemlock, or ponderosa pine. Results of the classification are given in table 4. The classification is generalized and site-quality areas as mapped in the field are broad, the minimum area being about 160 acres. It is recognized, however, that within these broad areas there may be small areas of higher or lower site quality.

Lands rated by the Douglas-fir classification total 2,181,000 acres, about 92 percent of the total commercial conifer land. Exactly a fourth of the Douglas-fir land is of site-quality class I or II. Site class I, the most productive, covers but 17,000 acres practically all in the lower portion of the Siuslaw drainage. It occurs on well-drained alluvial bottom lands and foot slopes. The acreage of site class II--528,000 acres--is significant and represents the better forest lands in the county. The bulk of the Siuslaw drainage is of this class; in the Willamette drainage, site class II lands are found on the lower slopes of the many valleys and on the lower lying benches. Site class III, the median site and most common in the Douglas-fir region, is found on 1,287,000 acres of middle slopes and benches. Broad areas of this site occur in the eastern portion of the county. Site classes IV and V lie on the upper slopes and ridge crests chiefly in the mountainous eastern portion; small areas of class IV occur along the summit of the Coast Range.

Lands rated by the spruce-hemlock classification include those occupied by stands of Sitka spruce and western hemlock near the coast and the balsam fir-mountain hemlock types on the higher slopes and ridges. Of the 198,000 acres so rated, nearly two-thirds is of site class V, the poorest, all of which is found at high elevations approaching the subalpine timber zone. Most of the remainder is of class IV on which is found the better balsam fir-mountain hemlock forests in the county. Stands of spruce on exposed locations near the ocean are also of this class. The small acreage of classes II and III is on protected areas a short distance inland from the coast.

The 1,270 acres rated by the ponderosa pine classification is of high productivity, class II.

Table 4.--Land areas, forest land areas, and commercial conifer areas by site quality class^{1/}

Data corrected to July 1, 1942

Kind of forest land and site quality class	Total area		Area in forest land	Area in commercial conifers
	Acres	Percent	Percent	Percent
Commercial conifer				
Douglas-fir				
Class I	17,445	0.6	0.7	0.7
Class II	527,735	17.8	20.6	22.2
Class III	1,286,625	43.5	50.3	54.1
Class IV	329,290	11.1	12.9	13.8
Class V	19,625	0.7	0.8	0.8
Total	2,180,720	73.7	85.3	91.6
Spruce-hemlock				
Class II	2,370	0.1	0.1	0.1
Class III	7,910	0.3	0.3	0.3
Class IV	60,305	2.0	2.3	2.5
Class V	127,140	4.3	5.0	5.4
Total	197,725	6.7	7.7	8.3
Ponderosa pine				
Class II	1,270		0.1	0.1
Total	1,270		0.1	0.1
Total commercial conifer	2,379,715	80.4	93.1	100.0
Woodland	8,325	0.3	0.3	
Lodgepole pine	74,315	2.5	2.9	
Subalpine	19,680	0.7	0.8	
Noncommercial rocky area	14,265	0.5	0.6	
Hardwood	59,180	2.0	2.3	
Total other	175,765	6.0	6.9	
All forest land	2,555,480	86.4	100.0	
Nonforest land	403,755	13.6		
Grand Total	2,959,235	100.0		

^{1/} The "site quality" of a forest area is its relative productive capacity, determined by climatic, soil, topographic, and other factors. The index of site quality is the average height of the dominant stand at the age of 100 years. Five site quality classes are recognized for both Douglas-fir and spruce-hemlock types and six classes for ponderosa pine types, Class I being the highest. In the survey, Douglas-fir classification was used for Douglas-fir and western redcedar types; spruce-hemlock classification was used for Sitka spruce, western hemlock, and fir-mountain types.

The site-class data were used in computing the volume of second-growth stands, in estimating their current annual growth rate, and in estimating the potential growth capacity of the county's commercial forest land.

Volume of Merchantable Timber

Determination of the volume of merchantable sound wood in the various species provides another measure of the county's forest resource. In compiling this volume estimate all conifer trees 15.1 inches and larger d.b.h. that contained at least one 32-foot log to a 12-inch top were included; trees of hardwood species 11.1 inches and larger d.b.h. that contained at least one 8-foot log to a 10-inch top were included.

Measured in log scale, Scribner rule, the conifer volume at time of reinventory was 54,538 million board feet; the hardwood volume was 292 million board feet.

The volume of Douglas-fir was 47,866 million feet, 87 percent of the total of all species. Slightly more than two-thirds of the fir volume was in old-growth trees, the remainder in second-growth trees.

The only other species of which there was an appreciable volume in the county were western hemlock and mountain hemlock with approximately 2,000 million feet each and western redcedar with slightly less than 1,000 million feet.

The volume of each species is shown in table 5.

Forest Ownership

In any analysis of the forest situation in a county, detailed statistics on the ownership of the saw-timber stands, the immature stands, and the deforested lands are of vital interest. Compilation of such statistics was a phase of the survey. Statistics on ownership of the forest land are given in tables 1 and 2 and on merchantable volume in table 5.

There are three broad classes of forest owners in Lane County--private, local governments, and the federal government. A general idea of the location of the forest land in each of these broad ownerships can be gained from a study of the outline map in figure 1. The eastern half of the Willamette River drainage lies within the boundaries of the Willamette and Umpqua National Forests. Within these boundaries the vast bulk of the land is in federal ownership; in the Willamette Forest there are small tracts of private land along the McKenzie River and some in an alternate-section pattern in the drainage of the Middle Fork Willamette River; in the Umpqua Forest there is a considerable acreage of private land also in an alternate-section pattern. The western half of the Siuslaw drainage lies within the boundaries of the Siuslaw National Forest. Although the bulk of the land in this forest is in federal ownership, there is a much larger percentage of alienated lands--

Table 5.--Volume of timber by species and ownership class

Data corrected to July 1, 1942

Trees 16" and more d.b.h.^{1/}

Thousands of board feet, log scale, Scribner rule

Species	Private	State		County	Indian	Federal				Total
		Available	Reserved			Revested land grant	Public domain ^{2/}	National forest		
								Available	Reserved	
Douglas-fir										
Large old growth	7,591,424	36,168	772	223,342		2,106,658	5,983	10,227,315	114	20,191,776
Small old growth	2,589,659	24,886	331	89,401		1,507,672	2,330	8,150,395	8	12,364,683
Large second growth	2,926,462	70,342	935	189,907	14,781	1,112,751	7,903	7,908,846	49,812	12,281,739
Small second growth	939,581	21,858	116	69,074	801	321,600	8,501	1,617,756	48,610	3,027,897
Sitka spruce										
Large	18,789		2,800	1,965	5		100	40,305		63,964
Small	25,524		405	900	93			6,135		33,057
Western hemlock										
Large	631,901	1,199	720	8,444	9	110,892	118	1,089,932		1,843,215
Small	64,895	109	80	633	1	12,093	13	120,967		198,791
Mountain hemlock	14,387	481		7,275				1,436,838	515,685	1,974,666
Western redcedar										
Live	325,664	1,682	90	6,652		114,321	60	534,230		982,699
Dead	116			20		200		4,843		5,179
California incense-cedar	79,393	201		2,979		23,791		145,459		251,823
Ponderosa pine	13,162					105		70,732		83,999
Sugar pine	19,306			11		1,128		97,313		117,758
Western white pine	12,249					117		203,378		215,744
Lodgepole pine								15,603	6,608	22,211
Pacific silver fir	11,340	140		2,260				337,006	16,151	366,897
Grand fir	67,649	229		725		46,829		67,793		183,225
Noble fir	3,043							298,102		301,145
Alpine fir								26,185		26,185
Engelmann spruce								394	884	1,278
Red alder	24,787	192	19	726	5	7,324	345	66,438	1	99,837
Bigleaf maple	51,738	595	28	2,130	1	22,026	150	83,341	10	160,019
Northern black cottonwood	24,839		55	14			100	787		25,795
Oregon ash	3,217		25	10			8			3,260
Oregon white oak	3,040									3,040
Total	15,442,165	158,082	6,376	606,468	15,696	5,387,507	25,611	32,550,094	637,883	54,829,882

^{1/} Trees of hardwood species taken from 12" and more d.b.h.^{2/} Includes 151 M board feet in a lighthouse reservation.

in private, county, or Indian ownership. The forest land in the central portion of the county is very largely in private ownership; exceptions include the federally owned revested Oregon and California Railroad grant lands and unappropriated public domain, scattered county-owned areas acquired through tax foreclosure, and small tracts owned by the State of Oregon.

Private

Collectively, private individuals and corporations own 835,000 acres of forest land, 33 percent of the total. There are very few large ownerships; the size of the average private forest holding in Lane County is probably as small as in any county in the Douglas-fir region in which the major portion of the original forest still stands. In 1939, it was estimated that private owners in the county numbered between 800 and 900 of which only about 50 held more than 640 acres and less than 10 owned more than 10,000 acres.

Saw-timber stands in private ownership aggregate 390,000 acres, 26 percent of the total area of this class of timber. A slightly greater portion--28 percent--of the merchantable timber volume is on private holdings. However, a considerably greater portion of the higher quality timber is on these holdings; they include more than one-half of the acreage and about three-eighths of the volume of the much sought after large old-growth fir. Also, because of their location, chiefly bordering the central valley, the private holdings include the more accessible stands.

Privately held second-growth stands, less than saw-timber size, total 286,000 acres, 41 percent of the total. More than three-fourths of this acreage is restocked cut-over land. They are among the more accessible stands in the county and occupy a proportionate share of the more productive sites. However, they average considerably lower in degree of stocking than do the publicly held second-growth stands.

About 86,000 acres or 69 percent of the recent cut-over land is in private ownership. This acreage does not represent the total private area logged since 1930 as nearly 4,000 acres has gone into county ownership through tax foreclosure. Seventy-seven percent of the nonrestocked cut-over land is privately held but only 29 percent of the nonrestocked burned-over acreage is so held.

National Forest

Within the boundaries of the three national forests there is a total of 1,368,000 acres in national-forest ownership, 54 percent of the total forest land and 52 percent of the commercial forest land in the county.

A total of 114,000 acres of which 47,000 acres is noncommercial forest land, is included in the Three Sisters Wilderness Area and is reserved as a museum of geology and natural history and for recreation;

the remainder of the national-forest timber is in an available-for-conversion status and subject to utilization under sustained-yield management.

Conifer saw-timber stands in national-forest ownership represent 62 percent of the county total. However, a smaller portion--56 percent--of the Douglas-fir saw timber is so held. The fir stands are chiefly of the small old-growth and large second-growth classes; the bulk of the former class is in the Willamette and Umpqua Forests and most of the latter is in the Siuslaw Forest. About 61 percent of the merchantable volume is on national-forest land.

The second-growth stands on national-forest land, which total 290,000 acres, are chiefly on burned-over land; restocked cut-over areas represent less than 3 percent of this acreage.

Areas currently in a deforested condition in the national forests include 12,000 acres of recent cut-over land and 17,000 acres of burned-over land; the latter is located in the remote mountainous portion of the Willamette Forest.

Although the national forests contain the vast bulk of the low productive lands, chiefly in the Willamette Forest, they also contain large areas of the highly productive sites; the major portion of the land in the Siuslaw Forest in Lane County is of site class II or better.

Revested Grant Lands

Third, in point of acreage, of the forest land ownerships is the revested Oregon and California Railroad grant land. Originally this grant consisted of the odd-numbered sections within a 20-mile strip on either side of the right of way of what is now part of the Southern Pacific Railroad system. Following the grant a considerable portion of these lands was disposed of either through homesteading or sale. However, in 1916 the federal government, claiming violation of certain terms of the grant, revested the remaining unsold lands, the bulk of which were forested. These revested lands are now administered by the Department of the Interior and, although covering considerably less acreage than the original checkerboard pattern, comprise an important forest ownership. They include slightly more than 10 percent of the total forest land in the county, similar percentages of the saw-timber and second-growth acreages, and only slightly less of the merchantable volume. In recent years, these forests have been placed under sustained-yield management.

Other Ownerships

Included in this group are some 19,000 acres of State-owned forest lands, 58,000 acres in county ownership, 6,000 acres of unappropriated public domain in federal ownership, and less than 2,000 acres of Indian trust allotments.

The State acreage consists of tax-foreclosed lands that have been received from the county, small fragments of the original school grant of sections 16 and 36 in each township, and areas in State parks. More than half of the acreage in this ownership is stocked with Douglas-fir second-growth stands.

The county lands have been acquired through tax foreclosure. Rather strangely, more than a third of the county-owned forests is of saw-timber stands which contain three-fifths of a billion board feet of merchantable timber. About half of the county acreage is stocked with second-growth Douglas-fir stands.

Forest Utilization

The forests of Lane County together with those of other southwestern Oregon counties comprise the last great frontier for the lumber industry, a frontier that has proven more and more attractive as accessible stands of old-growth timber in other districts of the Douglas-fir region have become depleted. Broad expansion of lumbering operations began in the county in the early 1920's and has continued with only one interruption--the depression of the early 1930's.

Available statistics on the volume of sawlogs and lumber produced in the county date from 1925, when the Forest Service in cooperation with the Bureau of the Census began compiling figures on the annual cut of sawlogs and lumber by species and county. These statistics show that the volume of sawlogs cut in 1925 totaled 261 million board feet and lumber produced totaled 286 million board feet. There were 48 active sawmills, of which a few were of medium size and the remainder were of small capacity. By 1929, sawlog production had risen to 453 million feet and 85 sawmills cut 479 million feet of lumber. Sawlog cut declined during the period 1930-32, reaching a low of 160 million feet in the latter year. Recovery began in 1933 and the volume of sawlog production increased steadily except in one year, 1938, when there was a slight easing off; by 1942 it had reached 802 million feet.

Expansion of the sawmilling industry in the county kept pace with the increase in logging activity. Up to 1940 the mills consumed the vast bulk of the logs cut locally; export of logs was confined chiefly to plywood logs. Construction of two plywood plants in the county in 1940, with a combined annual capacity of 172 million square feet of 3/8-inch, 3-ply plywood, provided a local market for the large volume of peeler logs cut from old-growth Douglas-fir stands. In the last year or two between 5 and 10 percent of the volume of logs cut in the county has been exported to mills in the lower Willamette Valley.

The sawmill industry that has developed in Lane County is unusual in the Douglas-fir region in that it is comprised of a large number of small capacity mills and a few of medium capacity in contrast to the 200- to 500-thousand-foot mills and larger that characterized the industry in the Puget Sound, Grays Harbor, and Columbia River districts.

In 1942, there were 112 active mills in the county. Only 19 had an actual 8-hour capacity of more than 50 thousand feet and 5 had a capacity of more than 125 thousand feet. The number of mills in each of several 8-hour capacity classes and their 1942 production of lumber is shown in table 6.

Table 6.--Number, actual 8-hour capacity, and annual production of active sawmills, 1942

8-hour capacity M board feet	Number	Annual production M board feet	Percent of total production
Under 25	63	108,442	14
26 - 50	30	221,394	28
51 - 80	8	116,996	15
81 - 125	6	150,522	19
126 - 200	5	188,774	24
Total	112	786,128	100

The large number of small units in the industry here can probably be attributed largely to the forest-ownership pattern in the county, characterized in general by a great number of small individually owned tracts and but a few large tracts in corporation ownership. Another factor influencing mill size here is the lack of tidewater or rivers navigable to transoceanic ships. Practically all of the large-capacity mills in the Douglas-fir region are located on tidewater.

In 1942 there were 10 active shingle mills in the county and production totaled 119 thousand squares. There were also a few wood-working plants but the vast bulk of the lumber cut was shipped from the county prior to remanufacture.

In addition to sawlogs, the forests of the county furnish a number of so-called minor products, some cut from trees of saw-timber size and some from smaller trees. Chief among these products are fuel wood, piling, poles, posts, and pulpwood. Recent reliable statistics are not available on the volume of material cut annually in the form of these products. However, a study made in 1930⁴ showed that the total volume

⁴/ Johnson, Herman M. The Production and Consumption of Minor Timber Products in Oregon and Washington. Office report, Pacific Northwest Forest Experiment Station, 1931.

of all of these products cut annually from trees of saw-timber size totaled 17 million board feet, and from trees of less than saw-timber size, 4 million cubic feet. In view of the large number of piling that has been cut in the county in recent years and an increase in volume of fuel wood cut, these estimates should probably be doubled, making an annual total of 34 million board feet.

Forest Depletion

In the foregoing discussion of forest utilization, it was pointed out that the volume of sawlogs cut in the county had been increasing steadily since the early 1930's and reached a total of 802 million board feet in 1942. Statistics on production in 1943 are not available but it is probable that the cut will closely approach that of the previous year.

This output of 802 million feet of sawlogs plus an estimated volume of 34 million feet cut as minor products approximates the total volume of timber being currently removed, on an annual basis, from the forests through commodity production. However, it does not represent the entire drain of timber of merchantable size and quality since a considerable volume of sound material is left in the woods. It is true that the volume now being left is appreciably smaller than that left prior to the wartime log market which has made it economically feasible to bring in top logs of the lower grades. Although the inventory statistics compiled by the survey made allowances for material left in the woods, this allowance was insufficient to cover all the volume left by some of the operations in the county which prior to 1941 removed only the first two 32-foot logs.

In addition to the drain on the forests due to cutting there has been some destruction of both merchantable and immature timber by natural agencies such as fire, insects, wind throw, ice storms, and diseases.

In the past, fire has probably been the most destructive of these natural agencies, at least the results of fire are much more readily observed although total damage is frequently difficult to appraise. Statistics, compiled from fire reports prepared by the agencies charged with the protection of the forests of the county, show that during the 5-year period 1937-41 the average volume of merchantable timber killed by fire annually was slightly more than a million board feet. The value of immature timber killed annually averaged about \$1,350.

The destruction of timber by the endemic activities of certain insects and tree diseases and through the throwing of an occasional tree by wind is inevitable and probably totals a considerable volume annually. However, such loss is considered normal and is allowed for in the compilation of growth and yield statistics. Loss due to abnormal insect or disease activities or wind throw in recent years has not been noted. In the early part of 1942, an ice storm caused considerable

damage to immature Douglas-fir stands in the central portion of the county; over quite large areas severe breakage of boles in pole stands was noted. Total loss caused by the storm has not been estimated.

Forest Growth

Through growth, the forests of the county are offsetting in part the drain placed on them by cutting, fire, and other agencies. The annual net increment being added currently was computed from data obtained in the reinventory.

In computing current growth, it was assumed that net increment is being added in stands under about 160 years of age; in stands from 160 to 300 years old, net increment is offset by net loss in older stands due to mortality, normal wind throw, and decay. On this basis the growth rate was computed for conifer stands covering 1,150,000 acres and for hardwood stands on 59,000 acres. About 98 percent of the acreage of growing conifers is stocked with Douglas-fir types, 1 percent of the acreage supports balsam fir-mountain hemlock types, and Sitka spruce and western hemlock types cover the remaining 1 percent.

The growth of conifers was computed in board feet for all trees 15.1 inches d.b.h. and larger, estimated in 32-foot logs to a 12-inch top, Scribner rule, and in cubic feet for all trees 5.1 inches d.b.h. and larger. Growth of hardwoods was computed in board feet for all trees 11.1 inches d.b.h. and larger estimated in 8-foot logs to a 10-inch top, and in cubic feet in trees 5.1 inches d.b.h. and larger.

The current annual growth, which may be defined as the annual increment of stands in their present condition, as computed is shown in table 7 by each of the forest-type groups.

Table 7.--Current annual growth, by forest type group, 1942

Type group	Area of growing stands Thousands of acres	Current annual growth	
		Millions of cubic feet	Millions of board feet
Douglas-fir	1,126	90.7	450.2
Sitka spruce	6	.6	1.8
Western hemlock	3	.3	2.4
Balsam fir-mountain hemlock	15	.6	.6
Total conifer	1,150	92.2	455.0
Hardwood	59	1.6	6.2
Total all types	1,209	93.8	461.2

Since current annual growth estimates do not show the potential productivity of the forest land, another form of growth, known as potential annual growth, was calculated. In making this calculation all commercial conifer forest lands in the county were assumed to be occupied by immature stands averaging 75 percent of normal stocking and with all age classes up to rotation age equally represented. On this basis it was estimated that the potential annual conifer growth in trees 15.1 inches d.b.h. and larger would be 740 million board feet and in trees 5.1 inches d.b.h. and larger, 249 million cubic feet.

Present and Future Aspects of Forest Situation

Study of the statistical information presented in the preceding tables and discussion reveals certain outstanding facts regarding the present forest situation in the county and suggests also possibilities for intensive forest management in the future.

The inventory statistics show a vast forest resource composed of a million acres of old-growth saw timber, very largely Douglas-fir, half a million acres of immature saw timber, also practically all fir, and a merchantable timber volume totaling 55 billion board feet. As a future timber supply the inventory also lists more than two-thirds of a million acres of immature stands, less than saw-timber size, the major part of which is fairly well stocked and, on the whole, quite evenly distributed as to age classes. An additional near fifth of a million acres of forest land, at present in a deforested condition is capable of becoming a valuable potential asset, if properly managed.

The depletion phase of the survey discloses a rapid increase in the annual rate of drain due to cutting during the last decade, culminating in a sawlog cut of more than four-fifths of a billion board feet in 1942. This increase in cutting operations appears to have been the result of a gradual expansion of the lumber and allied industries in the county plus the stimulus of the large war market for wood products during the past 2 or 3 years. Depletion due to fire and the other natural agencies has not been excessive in the past 5 years and, in the case of fire, averages appreciably less than in former like periods.

Growth calculations place the current annual increment being added by some million and a fifth acres of growing stands at 461 million board feet, about 55 percent of the current drain of 837 million feet. Current drain is also greater by about 13 percent than the estimated potential annual growth, obtainable only if all of the commercial forest land in the county was fairly well stocked with growing stands. However, these ratios of drain to current or potential growth do not appear to be too alarming when the large volume of mature and overmature timber is considered. During the harvest of a large resource of mature timber, removal of a volume in excess of the rate of replenishment through growth is reasonable provided that the mature timber is so harvested that prompt and satisfactory regeneration of cut-over lands is assured and that growing stock is not prematurely cut.

Determination of a theoretical allowable annual cut provides one measure of whether or not drain is out of line with growth and reserve supply of mature timber. Such a calculation has to be based on certain assumptions which may or may not materialize. Employment of the Hanzlik formula^{5/} in determining the allowable annual cut from the unreserved commercial forests of Lane County produced a figure of 832 million board feet. In making this calculation, it was assumed that a total of 39,208 million board feet of unreserved merchantable mature timber would be cut during a period of 100 years--the rotation--and that the actual mean annual increment of the immature timber for the rotation would be 440 million board feet. The volume of mature timber used did not include some billion and a half board feet of mountain hemlock, alpine fir, and lodgepole pine--little-utilized species that stock the upper slopes of the Cascades--although it was realized that in the course of the next 100 years it is possible that a portion of this volume may be utilized. In the calculation of the mean annual increment of the immature timber, the weighted average age and degree of stocking was compiled for each of the types; these averages were then used to adjust the standard yield tables. In the case of the immature timber, the standard of utilization was based on trees 11.1 inches d.b.h. and larger, scaled in 16-foot logs to an 8-inch top.

Although an allowable cut of 832 million board feet annually makes the current sawlog drain seem entirely reasonable, several disturbing factors are present. Chief among these is the premature cutting of immature stands in the county. A large area of immature saw timber (type 8) and pole stands (type 9) is in private ownership, practically all readily accessible and frequently owned in small tracts by individuals. In normal times these stands are subject to considerable cutting but at present, due to the high stumpage prices for both sawlog and piling timber, large acreages are being cut over often by selective methods which leave a sparse residual stand of low vitality trees and conditions unfavorable for future crops. Although contributing vital material needed in the war emergency, often with a minimum of transportation effort, this practice is poor forest management and should be discouraged in the postwar period. The above-mentioned calculation of allowable cut presupposed no cutting of immature stands prior to rotation age.

Currently, about 70 percent of the forest land acreage in the county may be said to be in stable ownership and, generally speaking, under sustained-yield or fairly intensive management. Included in this category are the federally owned national forests and Oregon and California Railroad revested grant land, the state-owned areas, and certain of the private holdings. The remaining 30 percent, in general, is comprised of small individual tracts in private and county ownership and

^{5/} In the Hanzlik formula, sustained annual yield equals the merchantable mature timber volume divided by the number of years in the rotation, plus the actual mean annual increment of the immature timber for the rotation.

includes a substantial acreage of immature timber, recent cut-over land, and nonrestocked older cut-over land and burns. Owing to the small size and scattered nature of the holdings and critical condition of the types this area is particularly in need of good management. In the aggregate, these small individual tracts constitute a large portion of the more productive forest lands in the county. Preference, by small owners of forest land, for small immediate returns from their holdings rather than waiting for larger future returns results in premature cutting of growing stands and in attempts to develop grazing land from cut-over areas physically better suited for forest production. In view of the present interest by corporations and individuals in holding immature forests for future crops, it is possible that some of the smaller private holdings will be blocked up to form managed units. In 1941 an enterprise, known as the Willamette Valley Tree Farms, Inc., and organized by a group of forest-owning lumber manufacturers, placed a large acreage of privately owned forest land in Lane County and neighboring counties under forest management. Included in the project were recent cut-over land, nonrestocked cut- and burned-over areas, immature timber from seedling to saw-timber size, and old-growth timber. Transfer of tax-delinquent areas, acquired by the county through foreclosure, to the state is another important step in the consolidation of forest lands into a stable ownership.

There is a real danger of overexpansion of the lumber industry in Lane County. Here again, stable ownership and sustained-yield management can provide a solution to the problem. Further growth of forest industries in the county should come through closer utilization and more intensive manufacture of the raw material. In the field of closer utilization, a proposed alcohol distillation plant, to be located at Springfield, will consume the surplus wood waste of several nearby sawmills. Although an expedient project designed primarily to produce a vital war material, it holds broad possibilities for future development. At present the vast bulk of the lumber sawn in the county is shipped in the rough. Remanufacture into sash and doors, box shooks, pattern stock, furniture, and other finished products would add many units to the present industry.